What is claimed is:

1. A beam source comprising:

a plasma generating chamber;

a first electrode disposed in said plasma generating chamber;

an antenna disposed so as to face said first electrode for generating plasma in said plasma generating chamber;

a second electrode disposed in said plasma generating chamber so as to face said first electrode; and

a power supply for applying a voltage between said first electrode and said second electrode to extract ions from the plasma generated by said antenna.

2. The beam source as recited in claim 1, wherein said antenna is disposed outside of said plasma generating chamber,

wherein said second electrode is disposed inwardly of said antenna.

3. The beam source as recited in claim 1, wherein said antenna has a spiral shape,

wherein said second electrode has a spiral shape positioned between adjacent spiral lines of said spiral shape of said antenna.

4. The beam source as recited in claim 1, wherein said antenna comprises a plurality of divided antennas,

wherein said second electrode comprises a plurality of divided second electrodes positioned between adjacent divided antennas.

5. The beam source as recited in claim 1, wherein said first electrode comprises an orifice plate having a plurality of orifices for neutralizing the ions extracted from the plasma.

6. A beam source comprising:

a plasma generating chamber;

a first electrode disposed in said plasma generating chamber;

an antenna disposed so as to face said first electrode for generating plasma in said plasma generating chamber;

a second electrode disposed between said antenna and said first electrode in said plasma generating chamber, said second electrode having a ring shape so as to surround said plasma generating chamber; and

a power supply for applying a voltage between said first electrode and said second electrode to extract ions from the plasma generated by said antenna.

7. The beam source as recited in claim 6, further comprising a container for defining said plasma generating chamber, said container having a wall which serves as said second electrode.

8. The beam source as recited in claim 6, wherein said first electrode comprises an orifice plate having a plurality of orifices for neutralizing the ions extracted from the plasma.

9. A beam processing apparatus comprising:

a stage for supporting a workpiece; and

a beam source for applying a beam to the workpiece supported so as to face said beam source by said stage, said beam source comprising:

a plasma generating chamber;

a first electrode disposed in said plasma generating chamber;

an antenna disposed so as to face said first electrode for generating plasma in said plasma generating chamber;

a second electrode disposed in said plasma generating chamber so as to face said first electrode; and

a power supply for applying a voltage between said first electrode and said second electrode to extract ions from the plasma generated by said antenna.

10. The beam processing apparatus as recited in claim 9, wherein said antenna is disposed outside of said plasma generating chamber,

wherein said second electrode is disposed inwardly of said antenna.

11. The beam processing apparatus as recited in claim 9, wherein said antenna has a spiral shape,

wherein said second electrode has a spiral shape positioned between adjacent spiral

lines of said spiral shape of said antenna.

12. The beam processing apparatus as recited in claim 9, wherein said antenna comprises a plurality of divided antennas,

wherein said second electrode comprises a plurality of divided second electrodes positioned between adjacent divided antennas.

13. The beam processing apparatus as recited in claim 9, wherein said first electrode comprises an orifice plate having a plurality of orifices for neutralizing the ions extracted from the plasma.

14. A beam processing apparatus comprising:

a stage for supporting a workpiece; and

a beam source for applying a beam to the workpiece supported so as to face said beam source by said stage, said beam source comprising:

a plasma generating chamber;

a first electrode disposed in said plasma generating chamber;

an antenna disposed so as to face said first electrode for generating plasma in said plasma generating chamber;

a second electrode disposed between said antenna and said first electrode in said plasma generating chamber, said second electrode having a ring shape so as to surround said plasma generating chamber; and

a power supply for applying a voltage between said first electrode and said second electrode to extract ions from the plasma generated by said antenna.

15. The beam processing apparatus as recited in claim 14, wherein said beam source comprises a container for defining said plasma generating chamber, said container having a wall which serves as said second electrode.

16. The beam processing apparatus as recited in claim 14, wherein said first electrode comprises an orifice plate having a plurality of orifices for neutralizing the ions extracted from the plasma.